AHRQ National Web Conference on the Role of Health IT to Improve Care Transitions

Presented by:
Anuj K. Dalal, MD, SFHM
David T. Liss, PhD
Sharon Hewner, PhD, RN, FAAN

Moderated by:
Commander Derrick L. Wyatt
Agency for Healthcare Research and Quality

September 26, 2019
Agenda

• Welcome and Introductions
• Presentations
• Q&A Session With Presenters
• Instructions for Obtaining CME Credits

Note: After today’s webinar, a copy of the slides will be emailed to all participants.
The following presenters and moderator have no financial interests to disclose:

- Anuj K. Dalal, MD
  Presenter
- David T. Liss, PhD
  Presenter
- Sharon Hewner, PhD, RN
  Presenter
- CDR Derrick Wyatt
  Moderator

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- At any time during the presentation, type your question into the “Q&A” section of your WebEx Q&A panel.
- Please address your questions to “All Panelists” in the drop-down menu.
- Select “Send” to submit your question to the moderator.
- Questions will be read aloud by the moderator.
At the conclusion of this web conference, participants should be able to:

1. Describe the role of health IT in improving health outcomes during care transitions for patients with complex conditions.
2. Describe how mHealth technology can be used to improve care coordination and transitions.
3. Identify barriers and facilitators of implementation, adoption, and use of a patient-centered discharge toolkit.
4. Discuss the use of clinical decision support tools to improve the quality of transitions for adults with multiple chronic diseases.
Interactive Patient-Centered Discharge Toolkit (PDTK) to Promote Self-Management During Transitions

Anuj K. Dalal, MD, SFHM
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Brigham and Women’s Hospital
Associate Professor of Medicine, Harvard Medical School
Associate Director, Brigham-Harvard Fellowship in Hospital Medicine
Learning Objectives

**Learning Objective 1:** Describe design and development considerations

**Learning Objective 2:** Identify barriers and facilitators to implementation, adoption, and use of patient-centered discharge tools in clinical practice

**Learning Objective 3:** Discuss potential impact of patient-centered discharge tools on key patient accounts
Background

• Transitions from the hospital can be unsafe, resource intensive, associated with poor experience
  ▶ Discharge process is often initiated late during the hospitalization
  ▶ Suboptimal discharge preparation can lead to delays, stress for clinicians, dissatisfaction among patients and caregivers

• Incorporating patient/caregiver-reported concerns about their discharge preparedness via standardized checklists may facilitate proactive identification of concerns prior to discharge
As part of our AHRQ-funded (R21 HS024751) study, we aimed to:

• Facilitate proactive discharge preparation by administering a 16-item electronic discharge checklist and web-based video to patients (or caregivers) approx. 24 hrs prior to their expected discharge date (EDD)

• Display patient-reported concerns from the checklist on a clinician-facing safety dashboard (integrated into the EHR) in real time

• Provide patients (or caregivers) the option of requesting secure post-discharge text messaging with their discharging attending
Methods

• Engaged institutional stakeholders to ensure intervention components aligned with organizational priorities:
  ► Identifying discharge barriers, improving accuracy of EDD entry, enhancing patient experience, reducing costs (decrease length of stay, readmissions)

• Implementation:
  ► Measured quantitative patient and clinician usage data and type/frequency of patient-reported discharge concerns
  ► Conducted interviews and observations, and analyzed feedback from patients and clinical staff; used a 2-person consensus approach to identify key implementation barriers and strategies to promote adoption

• Evaluation:
  ► Conducted pre-post study to assess impact of intervention on key clinical outcomes: Patient Activation (PAM-13), post-discharge healthcare resource utilization (urgent care, emergency room visits, readmissions)
Digital Health Intervention: PDTK
Enhancements to Epic-Integrated Infrastructure

Patient Facing

Mobile Tools

Clinician Facing

Bedside Display

Update
Notify
Checklist Complete?

<24 hours to EDD
Notify
Update
Enter EDD

<24 hours to EDD

Patient Safety Dashboard

Your Discharge Date: 8/5/17

Enter EDD <24 hours to EDD Checkliet Complete?
PATIENT DISCHARGE PREPARATION CHECKLIST
(To be completed by patients or caregivers
24-48 hours before estimated discharge date)

My Understanding
- I know my main reason for being hospitalized
- I know where I am going after I leave the hospital and how I am getting there
- My healthcare provider has answered all my questions about my discharge from the hospital

My Medications
- I understand what medications I will be taking (including local, over-the-counter, or herbal medications) and how to take them once I leave the hospital
- I understand how to get my medications and will try to complete all of my prescriptions before leaving the hospital
- I will be able to cover the out-of-pocket costs for medications I will need after leaving the hospital, as well as any authorizations required by my insurance plan
- I understand the potential side effects of my medications and who to contact if I should have one
- I am all set with my prescription home medications, I do NOT need any refills or renewals right now

My Self-Care Management
- I understand everything I can do to keep my health problems from coming back
- I understand what signs/symptoms I need to watch for and when to call my healthcare provider
- I understand what I can eat, what activities and exercise I am permitted to do, and when I can go back to the hospital
- I understand what medical equipment and supplies I will need after I leave the hospital and how to use them

My Follow-Up
- My family or someone close to me knows that I am leaving and will need support
- I have a follow-up appointment scheduled with my primary care provider and I know who to call if I need help and I have a plan in place to get to it
- I have the name and contact information of a hospital provider I can contact if a problem arises after I leave the hospital
- I understand the tests and procedures that require follow up as well as the ones that I need to have after I leave the hospital

Do you have additional concerns about your discharge?
(e.g., estimated discharge date, work notes, belongings, parking validation, specific questions, etc.)
Providers can review the checklist in the safety dashboard.

Upon submission, a checklist icon is triggered in dashboard → patient-reported data available in EHR in real time.

At discharge, initiate secure messaging thread.
• 752 general medicine patients approached from January 2018 to June 2018
  ▶ Checklist submitted for 510
  ▶ Checklist non-submitted for 242: patient unavailable (126); not appropriate per RN (97); declined (41); did not speak English or Spanish, no caregiver available (33); did not respond by email when reminded (8); encountered technical issues (8)

• Demographics of non-submitters:
  ▶ Older; more often Hispanic and non-English speaking; had non-standard insurance or self-insured, had higher DRG weights, longer lengths of stay; discharged to a destination other than home.
Discharge Checklist Results (N=510)

► 2,164 patient-reported concerns across all domains; 4.24 concerns per checklist submitted
► 355 plan (16.4%); 664 medications (30.7%); 437 self-care (20.2%); 656 followup (30.3%)
► 52 (2.4%) “Other”; unaddressed clinical concerns and non-medical barriers

Post-Discharge Messaging (N=422)

► 141 (33.4%) patients requested post-discharge messaging by providing their mobile phone number when they submitted a checklist
► Of these 141 requests, 3 (2.1%) physicians (2 attending, 1 senior resident) initiated communication
Implementation: Example of Secure Text Exchange After Discharge

Patients or Care Partners

Clinicians
# Implementation Themes: Description & Quotes

## Checklist and Video

| Valuable for patients | The checklist and video increased understanding of self-care needs and follow-up plans and promoted patient engagement and empowerment in the discharge process. | “I may think of questions I didn’t really have. Definitely worth it. It actually makes you think.” –a patient

| Patient utility dependent on timing of administration | The checklist and video were most useful when administered close to discharge, but prior to detailed discussion of discharge preparation by a care team member. | “Well, it was a little unclear given that we’re not about to leave. It’s hard to report on the process because it hasn’t actually happened yet.” –a patient

## Safety Dashboard

| Low awareness, variable workflow | Although clinicians were generally aware, checklist answers were variably viewed on the safety dashboard. | “[Discharge checklist responses] on the dashboard?... Did not know that.” –a clinician

| Reinforcement and reminders to use the safety dashboard to review patient-reported discharge concerns was variable. | “When it first rolled out there was a lot of information about it and then it just dropped off, and then the usage dropped off...” –a clinician

| The workflow for entering and updating EDD was inconsistent and included both clinical and non-clinical staff. | “[EDD] not really my workflow...I mean we'll put in [the EDD], and it'll get changed by a unit coordinator on a different pod” –a clinician

| Lack of optimization | Discharge column flag logic was often misinterpreted by different clinicians. | “The senior resident did not know really, what green [dashboard flags] meant...are [the patients] ready to be discharged?” –a clinician

| Summarized checklist responses displayed in safety dashboard were too broad and non-specific. Clinicians could not quickly access the entire checklist. | “I would look at [the safety dashboard] sometimes and wonder what [the patient] clicked off [on the checklist], but sometimes I couldn't tell exactly what they had questions about.” –a clinician

| Inconsistent leadership | Usage was dependent on senior level clinician leadership (attending or senior resident). | “…when the attendings were into it we were all into it for that week.” –a clinician

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**Checklist and Video**

- **Valuable for patients**: The checklist and video increased understanding of self-care needs and follow-up plans and promoted patient engagement and empowerment in the discharge process.

- **Patient utility dependent on timing of administration**: The checklist and video were most useful when administered close to discharge, but prior to detailed discussion of discharge preparation by a care team member.

**Safety Dashboard**

- **Low awareness, variable workflow**: Although clinicians were generally aware, checklist answers were variably viewed on the safety dashboard. Reinforcement and reminders to use the safety dashboard to review patient-reported discharge concerns was variable. The workflow for entering and updating EDD was inconsistent and included both clinical and non-clinical staff.

- **Lack of optimization**: Discharge column flag logic was often misinterpreted by different clinicians. Summarized checklist responses displayed in safety dashboard were too broad and non-specific. Clinicians could not quickly access the entire checklist.

- **Inconsistent leadership**: Usage was dependent on senior level clinician leadership (attending or senior resident).
Evaluation

• Enrolled 245 pre-intervention, 234 post-intervention
  ► 215 (45%) available for follow-up at 30-days
• Mean PAM-13 scores significantly increased from pre to post in unadjusted but not adjusted analyses
• Post-discharge healthcare utilization was unchanged
  ► Urgent care
  ► ED visits
  ► Readmissions
## Lessons Learned

### IMPLEMENTATION BARRIERS

<table>
<thead>
<tr>
<th>IMPLEMENTATION BARRIERS</th>
<th>STRATEGIES TO PROMOTE USE</th>
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<tbody>
<tr>
<td>Video</td>
<td>• Make videos available via patient portal, bedside display, television</td>
</tr>
<tr>
<td>Timing and access of video after admission to unit</td>
<td>• Engage nurses to have patients watch videos as EDD approaches</td>
</tr>
<tr>
<td>Too generic and impersonal</td>
<td>• Have clinical unit leaders create unit-specific videos</td>
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<td></td>
<td>• Create videos for each attending, play video for patient’s current attending by linking to the treatment team in the EHR</td>
</tr>
<tr>
<td></td>
<td>• Translate videos into common languages (e.g., Spanish) using medical interpreters</td>
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</table>
Lessons Learned

<table>
<thead>
<tr>
<th>IMPLEMENTATION BARRIERS</th>
<th>STRATEGIES TO PROMOTE USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checklist</td>
<td>• Determine optimal timing of checklist administration for specific patient categories</td>
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<tr>
<td></td>
<td>(e.g., admissions for acute on chronic disease exacerbations; awaiting procedures;</td>
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<td>undifferentiated diagnoses)</td>
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<td></td>
<td>• Demonstrate impact on key hospital priorities and process metrics (EDD accuracy, early</td>
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<td></td>
<td>hospital discharges)</td>
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<tr>
<td>Timing and administration</td>
<td>• Encourage patients to review checklist early during hospitalization</td>
</tr>
<tr>
<td></td>
<td>• Allow patients to update checklist responses as EDD approaches or changes</td>
</tr>
<tr>
<td>Patients’ belief that clinicians</td>
<td>• Identify workflow to update checklist after initial submission</td>
</tr>
<tr>
<td>will address all items</td>
<td>(e.g., notification via patient portal, email, or mobile app)</td>
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<tr>
<td>Checklist responses out-of-date</td>
<td>• Identify workflow to update checklist after initial submission</td>
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<tr>
<td>due to discharge delays</td>
<td>(e.g., notification via patient portal, email, or mobile app)</td>
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## Lessons Learned

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| Safety Dashboard Discharge Column | • Demonstrate how EDD can be viewed by patients (patient portal, bedside display) and clinicians (bedside display, dashboard)  
• Add a confidence indicator that estimates the likelihood that EDD will equal ADD to manage patient and clinician expectations  
• Demonstrate value of structured EHR data entry for driving dashboard logic (flagging red when EDD not entered)  
• Encourage checklist completion for patients at high risk for readmission by incorporating patient-specific readmission risk scores from EHR |
| Variable EHR data entry of key data elements (EDD, medical, non-medical barriers) |  |
| Competing quality improvement (QI) interventions | • Understand current institutional priorities and emerging workflows for identifying and escalating discharge barriers  
• Propose enhancements based on lessons from concurrent QI efforts |
| Poor specificity of patient-reported concerns viewed in dashboard | • Provide a link to discharge checklist questions and patient’s responses  
• Link patient-reported concerns to specific clinical actions (e.g., if poor understanding of main diagnosis, update After Visit Summary with condition-specific educational materials) |
## Lessons Learned

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| Secure Post-Discharge Messaging                              | • Frame the initiation of secure messaging thread as an opt-in process  
• Align with value-based incentives for clinical services (readmissions)  
• Communicate success stories from early adopters to assuage fears |
| Physician resistance                                         |                                                                                                                                                           |
| Managing patient expectations about whether physicians will initiate secure messaging | • Educate patients about the opt-in process for attendings  
• Encourage patients to request attendings to use this feature for clearly defined reasons (e.g., concern about obtaining a key medication) |
Conclusions (I)

• High degree of acceptance by patients and caregivers for completing the checklist and watching videos:
  ► Potentially useful strategy for engaging patients in discharge preparation at scale
  ► Most patients self-reported some uncertainty about specific checklist items, indicating they may not be well prepared for discharge

• Modest use of EHR-integrated components
  ► More work required to make the information more actionable for clinicians
Conclusions (II)

• Many patients requested post-discharge messaging; however, few clinicians acted upon the request:
  ► Patients want to communicate with their physicians after discharge
  ► Clinician awareness is poor, and they have no incentive to do this

• Key outcomes (patient activation, post-discharge resource utilization, readmissions) unlikely to be improved unless:
  ► Adoption challenges addressed
  ► Intervention used more routinely as part of clinical operations
THANK YOU!

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Using Location-Based Smartphone Alerts Within a System of Care Coordination

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Research Collaborators
• Tiffany Brown, MPH
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• Geoyia Nightengale, MPH
• Julie Wakeman, MOT MS
• Kenneth Weingardt, PhD

Participants/Partners
• Patient participants
• Erie Family Health Centers

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• Northwestern University Clinical and Translational Sciences Institute
• Northwestern Memorial Hospital
• Feinberg School of Medicine
• Care coordination: important but difficult
  ► Especially difficult *between* organizations
• Care transitions: multiple opportunities (& failure points)
• Provider-facing information technology (IT)
  ► Limited adoption of health information exchange (HIE)
  ► Health IT use not associated with receiving hospital discharge information

• Patient-facing IT
  ► Patient portals: low use by vulnerable populations
  ► Smartphone ownership nearly universal among age <65
  ► Rise of location-based smartphone services
    - Navigation
    - Ads
    - Ride hailing
Patient focus groups
• Most had Android OS
• Limited concerns with location tracking
• Minimize prompts/false alarms, battery drain

Clinician & care manager interviews
• ‘The only time I know when my patients are in the hospital is when I send them there’
• ‘We just want to know that they’re there, and then we can... triage whether they actually need to come in at a later date’
To design and implement an intervention that uses smartphone location tracking to facilitate care coordination following hospital encounters

1. App identifies hospital encounters*
2. Timely notification of care team
3. Team-based coordination

* Emergency department (ED) visits or inpatient admissions
Setting: FQHC with Care Management Program

Erie Family Health Centers delivers culturally sensitive health care to over 75,000 medical patients and 12,500 dental patients. Our community-based health centers are portals to high-quality care—and a higher quality of life—for all.

FQHC: federally qualified health center
http://www.eriefamilyhealth.org/
Study Phase 1 (of 2): Initial App Build

- Design retreat
- Android OS (English version)
- Hospital geofences, defined by latitude/longitude (N=41)
- Alpha testing/bug fixes
Care Coordination Workflows

1. Location-Based Notification*
   - ER Alert
   - 8:01 AM
   - Are you a patient in the hospital now?
     - YES
     - NO

2. User Confirmation
   - ER Alert
   - OK, got it.
   - We're sending a message to Erie to let them know you are a patient in the hospital.
   - If you or someone from the hospital wants to call Erie, please call the care management team at (312) 432-2688.

3. eFax Routed to EHR Desktop
   - A Message From the ER Alert App
     - The following patient confirmed they were receiving emergency or inpatient care:
       - Patient name: Doe, Jane
       - DOB: Nov 13, 1986
       - Patient phone: 8475551212
     - Based on their smartphone’s GPS coordinates, it appears they are at Westlake Hospital at 1225 Lake St. Melrose Park, IL 60160
     - As of March 2017, the main hospital phone number is 708.681.3000 and the number of the ED is 708.681.3000
     - The patient confirmed receipt of emergency or inpatient care Aug 3, 2017 at 13:22. However, they probably entered the hospital building at least 45 minutes before this confirmation occurred

4. Care Manager Outreach/Follow-Up
   - * After phone inside geofence for 45 minutes
Study Phase 1: Beta Test (2017)

• Aims
  1. Evaluate app’s ability to identify when user visited hospital
  2. Identify barriers to implementation

• Participants: high-risk patients in care management program for Medicaid enrollees
• 3-month followup
• Hospital encounters confirmed by chart review

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N (%)</th>
</tr>
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<tbody>
<tr>
<td><strong>Total</strong></td>
<td>N=12</td>
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<td>Age, mean (range)</td>
<td>38 (18-58)</td>
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<td>Female</td>
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<td>Medicaid insurance</td>
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<td>Black/Af-Am</td>
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<td>Hispanic/Latino</td>
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<td>Diabetes</td>
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<tr>
<td>Asthma</td>
<td>6 (50)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>5 (42)</td>
</tr>
</tbody>
</table>
Beta Test: Results

- Participants obtained care at 7 regional hospitals
  - 5 ED/inpatient encounters (4 hospitals)
  - 9 outpatient visits
  - 7 other events (e.g. visiting loved ones)
- Sensitivity*: 57-75%
- Positive predictive value of notifications: 90-92%

* After smartphone within a hospital for ≥45 minutes
## Beta Test: Implementation Barriers

<table>
<thead>
<tr>
<th>Observed Barriers</th>
<th>Changes for Study Phase 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited cell service inside hospitals</td>
<td>Enhanced detection algorithm to increase sensitivity</td>
</tr>
<tr>
<td>ED visits: confusion when asked if “in the hospital”</td>
<td>Notifications ask if “in the ER/hospital”</td>
</tr>
<tr>
<td>Slow page loading &amp; background processing</td>
<td>Enhanced programming code</td>
</tr>
<tr>
<td>Concerns about file size/ storage</td>
<td>Added FAQ page/tab</td>
</tr>
<tr>
<td>Low sensitivity for adjacent/overlapping geofences</td>
<td>Smaller and/or combined neighboring geofences</td>
</tr>
</tbody>
</table>
**Study Phase 2: Feasibility Study (2018-19)**

- **Aims**
  1. Evaluate time to post-discharge followup
  2. Explore users’ experiences
  3. Identify desired features

- **English & Spanish speakers in care management**

- **4-month followup**

- **Hospital encounters confirmed by claims data**

- **Timely followup: contact within 3 business days OR in-person visit within 1 week of discharge**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N (%)</th>
</tr>
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<tbody>
<tr>
<td><strong>Total</strong></td>
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<td>Female</td>
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<td>Medicaid insurance</td>
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<td>Race/ethnicity</td>
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<td>Black/Af-Am</td>
<td>16 (28)</td>
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<td>Hispanic/Latino</td>
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<td>Limited health literacy</td>
<td>18 (32)</td>
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<td>Diabetes</td>
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<tr>
<td>Asthma</td>
<td>6 (50)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>5 (42)</td>
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</table>
Feasibility Study: Android Curveball

• Sporadic data transmissions, app often went to sleep
  ▶ Manufacturer changed background app/battery saver settings

• Information sources FQHC used to identify encounters (N=23 encounters at 12 hospitals)
  ▶ App: 7
  ▶ Hospitals: 7
  ▶ Patient self-report: 6
  ▶ Payer-linked portal: 10
# Feasibility Study: Timely Followup

<table>
<thead>
<tr>
<th>Participant ID</th>
<th>Encounter type</th>
<th>Information source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Observation stay</td>
<td>✓</td>
</tr>
<tr>
<td>2</td>
<td>ED visit</td>
<td>✓</td>
</tr>
<tr>
<td>3</td>
<td>ED visit</td>
<td>✓</td>
</tr>
<tr>
<td>4</td>
<td>ED visit</td>
<td>✓</td>
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<tr>
<td>5</td>
<td>ED visit</td>
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<tr>
<td>6</td>
<td>ED visit</td>
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<tr>
<td>7</td>
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<td>8</td>
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<td>9</td>
<td>ED visit</td>
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<tr>
<td>10</td>
<td>ED visit</td>
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</tr>
<tr>
<td>11</td>
<td>ED visit</td>
<td>✓</td>
</tr>
<tr>
<td>11</td>
<td>Inpatient admission</td>
<td>✓</td>
</tr>
<tr>
<td>12</td>
<td>ED visit</td>
<td>✓</td>
</tr>
<tr>
<td>13</td>
<td>ED visit</td>
<td>✓</td>
</tr>
<tr>
<td>14</td>
<td>Inpatient admission</td>
<td>✓</td>
</tr>
<tr>
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<td>✓</td>
</tr>
<tr>
<td>13</td>
<td>ED visit</td>
<td>✓</td>
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</tbody>
</table>
## Encounters where timely follow-up not completed (n=7)

<table>
<thead>
<tr>
<th>Participant ID</th>
<th>Encounter type</th>
<th>Information source</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Payer Portal</td>
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<td>Hospital</td>
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<td></td>
<td></td>
<td>App</td>
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<tr>
<td></td>
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<td>Patient Self-Report</td>
</tr>
<tr>
<td>16</td>
<td>ED visit</td>
<td>✓</td>
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<tr>
<td>5</td>
<td>ED visit</td>
<td>✓</td>
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</tr>
<tr>
<td>13</td>
<td>ED visit</td>
<td></td>
</tr>
</tbody>
</table>
User Experience: Findings

• Common qualitative themes
  ► Appealing/good idea
  ► Efficient/effective solution
  ► Technical difficulties: barrier to acceptability

• Desired new features
  ► Manual reporting of hospital encounters
  ► List of prior hospital encounters (password-protected)
  ► Optional free text fields
    - Why I’m here
Discussion

• Developed care coordination app & implemented in a high-risk, low-income sample
  ➤ Phase 2: low detection of hospital encounters due to technical (but fixable) issues

• Patients understand & support goals of app
  ➤ Limited use

• Study limitations
  ➤ Small N
  ➤ Observational data
  ➤ Not generalizable to integrated systems or regions with HIE
Potential Utility for Practices & Health Systems

- Improve patient experience
- Payer reimbursement
  - Transitional care management: CPT 99495, 99496
- Reducing avoidable inpatient use
  - Readmissions
  - Initial admission from ED

Diagram:
- ED arrival
- Inpatient admission
- Discharge
- Outreach to patient/ED
- Begin discharge planning
- Followup
Conclusions/Recommendations

• Smartphones can be valuable care coordination tool, especially for vulnerable populations
  ► Limited user training after onboarding/installation
  ► Potential expansion/integration with other app functions

• Be mindful of OS updates/manufacturer settings
  ► Challenges & opportunities

• Partner with stakeholders at every step
  ► Integrate patient-centered app with care team workflows


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Coordinating Transitions: Health Information Technology’s Role in Improving Multiple Chronic Disease Outcomes

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Acknowledgement

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Partners

• Elmwood Health Center, FQHC
• HEALTHeLINK WNY Clinical Information Exchange
• New York State Medicaid Data Warehouse

Funding

• This project was supported by grant number R21HS022575 from the Agency for Healthcare Research and Quality.
Multiple Problems

1. Finding out that a patient, who was on the primary care’s roster of patients, was discharged from the hospital.

2. Limiting the care alerts to those likely to benefit from more intensive care coordination.

3. How to comply with HIPAA requirements about data sharing.

4. Integrating assessment of social determinants of health into screening.
The project goal was to reduce low-value utilization (IP and ED) in the population with pre-existing chronic conditions, and to increase OP followup, especially after discharge.

- This aligned with national emphasis on avoiding admissions, and with the NY State Delivery System Reform Incentive Program (DSRIP) which was a 5-year statewide project started in 2015.
Methods

- Setting: urban PCMH with roster of 6,000 (1/3 on Medicaid)
- Population: population with preexisting major chronic conditions
- Intervention: technology supported RN outreach
- Evaluate change in IP and ED utilization rates in study & comparison practices
- Evaluation: descriptive statistics and negative binomial regression
Technology and Big Data Approach

- Targeting the right population
- Alerting the primary care practice (HIE)
- Assessing social determinants of health during outreach call
- Outcome analysis
Relied on using existing de-identified electronic data from the Medicaid Data Warehouse and the interoperable exchange of health information across settings:

• Automated care transitions alerts delivered using HIE within 24 hours of discharge

• Complexity algorithm for case identification and outcomes analysis

• Social and behavioral determinants of health integrated into care planning

• Health outcomes analysis that demonstrates the value of the nursing intervention
1. Automated electronic notification of discharge to nurse care coordinator in primary care using Care Transition Alerts for cohort with pre-existing chronic disease.

2. Care coordinator telephone outreach incorporating Patient-Centered Assessment Method (PCAM).

3. Integrating social determinants into care plan that is shared with interprofessional team across settings.

Targeting the Chronic Cohort: COMPLEXedex™ Clinical Algorithm

- Practice sent SON medical record number and diagnoses from last 3 years of claims monthly
- Algorithm used to flag those with major chronic conditions
- HEALTHeLINK used flag to limit alert to chronic cohort
PCAM: An Evidence-Based Tool to Assess Social Determinants of Health

Completed by RN as part of outreach phone assessment.

12 items in 4 domains with 4 levels of severity.

- Health & wellbeing
- Social environment
- Health literacy & communication
- Service coordination
CDS involved transforming paper-based tool into meaningful information that could be incorporated into a longitudinal shared care plan.
Comparison of the CTI Intervention Within the Context of the Quadruple Aim

<table>
<thead>
<tr>
<th>Steps to achieve fourth aim</th>
<th>CTI intervention implementation tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Implement team documentation</td>
<td>Nursing documented assessment and problems and adjusted the care plan in the EHR</td>
</tr>
<tr>
<td>2. Use pre-visit planning</td>
<td>Secure alerts notified the nurse care coordinator to initiate an outreach phone call to high-risk cases for readmission</td>
</tr>
<tr>
<td>3. Expand the role of the nurse</td>
<td>Nurse received calls, made outreach calls, identified problems, engaged appropriate team members, and updated interprofessional care plan. Workshops and weekly feedback to nurse during implementation supported and reinforced benefit of expanded role</td>
</tr>
<tr>
<td>4. Standardize and synchronize workflows</td>
<td>Identification of vulnerable population, linked to discharge notification, enabled care coordinator to engage high-risk patients proactively</td>
</tr>
<tr>
<td>5. Co-locate the team</td>
<td>The primary care team was currently working in a single practice setting</td>
</tr>
</tbody>
</table>
The Coordinating Transitions Intervention was not limited to Medicaid population, providing care coordination to all patients in the chronic cohort.

However, results are based exclusively on data from the Medicaid Data Warehouse.
Medicaid Chronic Cohort Results

- Utilization results are based on the adult Medicaid population with pre-existing chronic conditions (chronic cohort -- based on clinical algorithm)
- The intervention (study) practice has a roster of ~6,000 cases with 419 persons in the chronic cohort
- Two urban comparison practices with large Medicaid populations
- Comparison with remaining Medicaid population in the chronic cohort

Higher-Value Utilization

<table>
<thead>
<tr>
<th>Group (population in 2015)</th>
<th>Event Type</th>
<th>2014 rate per 1,000</th>
<th>2015 rate per 1,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention site (N=419)</td>
<td>IP</td>
<td>338</td>
<td>255</td>
</tr>
<tr>
<td></td>
<td>ED</td>
<td>2,038</td>
<td>1,327</td>
</tr>
<tr>
<td></td>
<td>OP</td>
<td>6,996</td>
<td>8,907</td>
</tr>
<tr>
<td>Other regional Medicaid (N=38,612)</td>
<td>IP</td>
<td>358</td>
<td>297</td>
</tr>
<tr>
<td></td>
<td>ED</td>
<td>1,754</td>
<td>1,434</td>
</tr>
<tr>
<td></td>
<td>OP</td>
<td>7,925</td>
<td>8,253</td>
</tr>
</tbody>
</table>

Note: IP = Inpatient, ED = Emergency Department, OP = Outpatient

• Both groups moved toward higher value utilization with lower IP & ED and higher OP utilization

• However the rate change was greatest in the intervention site

• Intervention site met Delivery System Reform Incentive Program 5-year goals 2015, first year of program
Comparison of IP, ED OP Growth Rates Among Practice Sites

- Comparison A & B were two urban primary care practices with large Medicaid populations.
- The decrease in IP & ED in “other Medicaid” was accompanied by only 4% increase in OP utilization – not clinically significant.
Statistical Significance in Growth Rates

- Negative binomial regression used when trying to understand rare events, such as IP hospitalization in primary care settings.

- All changes highly significant in other Medicaid (N = 39,612), while clinically significant IP reduction (25%) in Intervention site was closest to statistical significance (p < .10) in single practices.

<table>
<thead>
<tr>
<th></th>
<th>Change in IP Rate</th>
<th>Change in ED Rate</th>
<th>Change in OP Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study</td>
<td>↓ 25% *</td>
<td>↓ 35%**</td>
<td>↑27%**</td>
</tr>
<tr>
<td>Comp A</td>
<td>↓ 8%</td>
<td>↓ 27%**</td>
<td>↑17%**</td>
</tr>
<tr>
<td>Comp B</td>
<td>↑3%</td>
<td>↓ 9%*</td>
<td>↑11%**</td>
</tr>
<tr>
<td>Other</td>
<td>↓ 17% **</td>
<td>↓ 18%**</td>
<td>↑4%**</td>
</tr>
</tbody>
</table>

Note. * indicates p < .10, * indicates p < .05, ** indicates p < .001
Estimated Economic Impact

- Avoided events based on the difference between expected IP and ED utilization rates based on 2014 and actual rates in 2015 for the population size in 2015
- Events avoided multiplied by $10,855 for IP and $1,077 for ED
- Additional OP visits generated $71,289 of new revenue to support the expanded role of the RN care coordinator

<table>
<thead>
<tr>
<th></th>
<th>Population size in 2015</th>
<th>Avoided IP Events</th>
<th>Avoided ED Events</th>
<th>Total $ avoided</th>
<th>$ Avoided per person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study</td>
<td>419</td>
<td>-35</td>
<td>-298</td>
<td>-$699,117</td>
<td>-$1,669</td>
</tr>
<tr>
<td>Comp A</td>
<td>963</td>
<td>-22</td>
<td>-414</td>
<td>-$689,616</td>
<td>-$716</td>
</tr>
<tr>
<td>Comp B</td>
<td>2,086</td>
<td>18</td>
<td>-333</td>
<td>$165,050</td>
<td>$79</td>
</tr>
<tr>
<td>Regional</td>
<td>38,612</td>
<td>-2,341</td>
<td>-12,354</td>
<td>-$38,792,171</td>
<td>-1,005</td>
</tr>
</tbody>
</table>
Short-term Outcomes

- Practice is using the same resources more efficiently and effectively without increasing the workload burden on providers.
- While reducing unnecessary hospitalizations and emergency visits.
- By providing supportive person-centered care during transitions.
- Spread of high-quality, high-value transitional care requires novel solutions to improve the healthcare system.
- Redesigned, technology-enabled systems that authentically engage all members of the care team can achieve quadruple aim.
Linking Evidence to Action

• Care coordination efforts must transcend settings and share information about social factors that affect health

• Moving from triple to quadruple aim requires attention to workflow, meaningful alerts, targeting the appropriate population

► Implications for management, practice, and education
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